FAA-E-2492/1
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DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION SPECIFICATION

TURNKEY FACILITY ESTABLISHMENT FOR INSTRUMENT LANDING SYSTEMS PART 1 GENERAL REQUIREMENTS

This Part 1 is one of a group of specification documents under the basic heading Turnkey Facility Establishment for Instrument Landing Systems, each of which carries the basic number FAA-E-2492 together with a slant line and number corresponding to the Part number (see listing below). Each Part should be separately referenced by its individual specification number, including revision suffix letter, if any, and any amendment which is applicable to the individual Part.

Listing of Parts:

FAA-E-2492/1	Part 1	General Requirements
FAA-E-2492/2	Part 2	System Equipment Requirements
FAA-E-2492/3	Part 3	Site Preparation and Plant Construction
FAA-E-2492/4	Part 4	Installation, Tune-up and Preliminary Checks
FAA-E-2492/5	Part 5	Training Requirements

Part 1

1-1. SCOPE

1-1.1 Scope.- This Part 1 contains requirements which are applicable, alone or in conjunction with other Parts of this specification for the turnkey establishment of instrument landing systems.

1-2. APPLICABLE DOCUMENTS

1-2.1 FAA publications.- The following FAA publications, of the issues in effect on the date of the invitation for bids or request for proposals, form a part of this specification and are applicable to the extent specified herein.

Handbook 6750.16	Siting Criteria for Instrument Landing Systems
Federal Aviation Regulations	Part 77, Subpart C
Handbook 6200.4A	Test Equipment Management Handbook, Section 2, Paragraph 54
OA P 8200.1	United States Standard Flight Inspection Manual
Handbook 8260.3A	United States Standard for Terminal Instrument Procedures (TERPS)
FAA-STD-002	Federal Aviation Administration Standard for Engineering Drawings

(Copies of FAA specifications and other publications may be obtained from the Contracting Officer in the office issuing the invitation for bids or request for proposals. Requests should fully identify material desired, i.e., specification amendment. Requests should cite the invitation for bids, request for proposals or the contract involved, or other use to be made of the requested material.)

1-3. REQUIREMENTS

1-3.1 Equipment and services to be furnished by the contractor.- The contractor shall provide all equipments, materials, and personnel services, except for those furnished by the Government (1-3.2) in accordance with Parts 1 through 5 of this specification. The "turnkey" concept charges the contractor with all the tasks necessary to provide selected airports

with an instrument landing system commissioned to meet Category I operation. See 4-3.7.3 for exceptions to Category I service. Training requirements generated by this specification shall be provided in accordance with Part 5 of this specification as stated in the invitation for bids or request for proposals.

1-3.1.1 Electronic equipment.- The electronic equipment established under this specification shall be in accordance with Part 2 of this specification and shall be provided either by the Government or contractor furnished as stated in the invitation for bids or request for proposals.

1-3.1.1.1 Test equipment.- The Government shall furnish the necessary test equipments for the preventive and corrective maintenance of all electronic equipments (1-3.1.1) in the system. All required initial tuning adjustments and maintenance procedures shall be performed using only the test equipment listed in FAA Handbook 6200.4A, "Test Equipment Management Handbook," Section 2, Paragraph 54, as it applies to the particular equipments. The use of any other test equipment shall not be allowed.

1-3.1.2 Site engineering report.- The contractor shall provide for each place-name specified in the invitation for bids or request for proposals, a detailed engineering plan in accordance with 1-3.5.2 of this specification. A report covering the contractor's findings and recommendations shall be submitted for Government review and approval. The contractor shall not commence any site activities until the report is approved by the Government.

1-3.1.3 Site preparation and plant construction.- Subsequent to approval by the Government of the Site Engineering Report (1-3.1.2), the contractor shall proceed with Part 3 of this specification. The contractor shall clear each site and perform all construction work necessary prior to the final installation of the electronic equipments.

1-3.1.4 Installation, tune-up and preliminary checks.- The contractor shall perform installation, tune-up of the electronic equipments, and preliminary checks of the facility in accordance with Part 4 of this specification. Remote radio monitoring in the control tower (or designated control point) shall be installed for all glide slope and localizer facilities, except where it is not feasible due to technical or other limitations, in which case remote monitoring via landlines will be authorized. After satisfactory completion, the contractor shall call for commissioning system flight inspection in accordance with 4-3.9.

1-3.2 Government and/or sponsor responsibilities.-

1-3.2.1 Facility place-name.- The Government shall specify in the invitation for bids or request for proposals, the geographic locations where instrument landing systems will be installed, including airport place-names, runway identifiers, and approximate facility locations at a particular runway within the limitations of Handbook 6750.16. Priorities for the establishment of the facilities will also be listed with the place-names.

1-3.2.2 Facility frequencies.- Facility frequencies for each place-name shall be included in the invitation for bids or request for proposals.

1-3.2.3 Type of ILS system.- The Government shall provide the contractor with information on the type (4-1.2) of ILS system to be installed. The type of system and equipment shall be dependent on individual airport requirements.

1-3.2.4 Remote monitoring and control.- The Government shall specify in the invitation for bids or request for proposals the kind and location (1-3.1.4) of remote monitoring for each facility. Requirements for remote monitoring of outer or middle markers, or both, using landlines shall be specified by the Government. The Government shall specify in the invitation for bids or request for proposals those locations that will require remote control equipment in addition to remote monitoring.

1-3.2.5 COMLO requirements.- The Government shall specify in the invitation for bids or request for proposals its requirements for compass locators (COMLOs) at specific facility place-names.

1-3.2.6 Land acquisition.- All land acquisition, as required, for establishment of the facility shall be accomplished by the Government or the airport sponsor.

1-3.2.7 Grading.- Major grading and leveling shall be accomplished by the airport sponsor.

1-3.2.8 Obstruction clearances.- Obstruction clearances for the approach and missed approach areas shall be in accordance with Federal Aviation Regulations, Part 77, Subpart C, FAA Handbook 6750.16, "Siting Criteria for Instrument Landing Systems," and FAA Handbook 8260.3A, "United States Standard for Terminal Instrument Procedures, (TERPS)" and shall have been accomplished by the Government or the airport sponsor prior to contract award.

1-3.2.9 Right of way.- Right of way for access roads, power and telephone lines shall be arranged for and obtained by the Government. License, permit, etc., shall be negotiated by the Government with the owner(s).

1-3.2.10 Glide slope angle.- For each facility place-name identified in the invitation for bids or request for proposals, the Government shall specify the desired glide slope angle (nominal 3 degrees) as well as the minimum and maximum allowable angles consistent with threshold crossing height and obstacle clearance criteria. Final glide slope angle shall be determined by the contractor within the constraints as determined above and those contained in Handbook 6750.16.

1-3.2.11 Commercial power.- The Government shall be responsible for providing commercial power service to the subsystems as follows:

a. Localizer - to a termination point as shown on the airport information charts (1-3.2.12).

b. Glide slope - to a termination point as shown on the airport information charts (1-3.2.12).

c. Markers and COMLOs - to within 250 feet from the center of the facility plot.

d. Markers only - to 100 feet from the equipment pole.

Service voltage at the tiepoint will be determined by the Government.

1-3.2.12 Airport information charts.- For each facility place-name identified in the invitation for bids or request for proposals, the Government shall furnish airport chart(s) to the bidders. These shall include, where possible, aerial photographs, obstruction plan (for ends of the runway), contours in the vicinity of the proposed locations, and ground profiles of the extended runway centerlines, and the termination point for commercial power.

1-3.2.13 Flight inspection aircraft.- Commissioning flight inspection of each system shall be conducted by the Federal Aviation Administration. The contractor will be required to formally request flight inspection services at least 30 days prior to the scheduled date of the flight inspection. The Government shall be responsible for the costs incurred in flight inspection to the extent that the actual onsite flying hours do not exceed the following:

a.	Dual full ILS	28 hours
b.	Dual full ILS with capture effect glide slope	40 hours
c.	Single full ILS	18 hours
d.	Single full ILS with capture effect glide slope	30 hours
e.	Single localizer, outer marker	9 hours
f.	Single glide slope, middle marker	10 hours
g.	Compass locator	3 hours

h.	Dual null reference conversion to dual capture effect	24 hours
i.	Single null reference conversion to single capture effect	16 hours
j.	Single null reference conversion to single sideband reference	10 hours

Any costs in excess of these hours shall be the responsibility of the contractor at a rate of $315 per hour.

1-3.3 System design, integration and checkout constraints.- When the site preparation, plant construction, installation, tune-up of the equipment is performed in an operational environment, Air Traffic Control activities and services will have priority over all contractor activities. There shall be no compromise for the safe and timely control of aircraft during this entire period. The turnkey contractor shall provide his services in such a manner to minimize disruptions to Air Traffic Control facilities. Appropriate, mutually (Government and contractor) agreed upon adjustments will be made if constraints are imposed. The Government reserves the right at any time to take the action necessary in the performance of its obligation with respect to Air Traffic Control. When it is deemed necessary by the Government to exercise constraints which delay the contractor performance, an appropriate adjustment in the contractor's schedule will be made. Compensation for contractor idle time resulting from Government imposed constraints will be negotiated in accordance with the contract provisions.

1-3.4 FAA technical representatives.- The Government shall designate individuals as technical representatives (FAA TR) for the various phases of the ILS turnkey project. These representatives so designated will be the point of contact for the Government in their assigned areas.

1-3.5 Contractor services and responsibilities.-

1-3.5.1 General administrative and support services.- The contractor shall be responsible for the performance of all administrative and support services necessary under the provisions of the contract.

1-3.5.1.1 Office facilities.- The contractor shall furnish all office space, furniture and supplies as required for his use.

1-3.5.1.2 Miscellaneous services.- The services required for the movement of contractor personnel, mail, and materials at each location shall be the contractor's responsibility. Storage and security of onsite materials shall be the responsibility of the contractor. To the extent that suitable Government storage facilities are available onsite, it shall be made available to the contractor. It will be the contractor's responsibility to ascertain the availability of such facilities and request access thereto in his engineering report.

1-3.5.2 Contractor's engineering report.- The following subparagraphs are requirements applicable to the preparation of the site engineering report.

1-3.5.2.1 Site survey and evaluation.- For locations specified in the invitation for bids or request for proposals, the contractor shall perform a site survey and evaluation to determine equipment and site requirements for Category I ILS operation.

1-3.5.2.1.1 Kind of glide slope.- By visual inspection of site, application of criteria in Handbook 6750.16, etc., he shall make a recommendation as to the kind of glide slope system to be installed, namely null reference, capture effect, or sideband reference.

1-3.5.2.1.2 Facility location.- Determine the exact location of the ILS system; localizer, glide slope, marker(s), monitoring equipment and compass locator (where required). If the selected locations result in exceeding any of the governing criteria of Handbook 6750.16, the contractor shall submit a letter of request for waiver to the Government. The contractor must obtain written approval of waiver prior to proceeding with the site survey.

1-3.5.2.1.3 Site test requirements.- The contractor may feel that a site test is required at some difficult sites. This may be necessary where serious terrain irregularities exist such as sharply changing ground close to the glide slope antenna, or the presence of large metal buildings adjacent to a proposed runway. In these instances, the contractor shall recommend a site test in the site engineering report (1-3.5.2) and the Government will respond to the recommendation during the review process. If the Government confirms the requirement for a site test at a specific location, an appropriate adjustment in the contractor's schedule will be made. Compensation for contractor idle time resulting solely from the performance of the site test will be negotiated in accordance with the contract provisions.

1-3.5.2.1.4 Additional clearing.- Determine the acreage of possible clearing and grubbing, and the volume of earth work required above and beyond Paragraph 1-3.2.7 because of unusual terrain which will have a significant effect on ILS performance. The effort here will be limited to minor leveling or grading in the immediate area of the facility to accommodate the ILS shelters and provide for proper drainage of the site.

1-3.5.2.1.5 Plant survey.- Recommend routing of primary power, telephone lines (if required for remote monitoring) and access roads to the various sites and determine trenching and ducting requirements.

1-3.5.2.1.6 Land availability.- In association with Airport Authorities and FAA regional representatives, the status of land acquisition and availability shall be confirmed, particularly with regard to needs in the case of marker beacons.

1-3.5.2.2 Coordination.- The site survey shall include liaison with airport authorities and local FAA representatives to determine requirements. The site engineering report covering such items as any additional grading or land preparation, land and right-of-way acquisitions, power tiepoints, and the type of installation recommended shall be prepared with the cognizance and agreement of airport authorities and FAA regional representatives.

1-3.5.2.3 Recommendations and report preparation.- As a result of data obtained from the site survey and evaluation, the contractor shall submit for Government review and approval a detailed engineering report covering its findings and recommendations. The report shall include all essential elements for site construction and installation within the criteria set forth in applicable FAA documents relating to ILS siting criteria, airport layout, obstruction clearances (1-3.5.2.3.1) depicting site layout, construction specifications, etc. The report will be responsive to the requirements for Parts 3 and 4 of this specification including:

a. Exact location details of equipment to be installed (localizer, glide slope, monitor, COMLO, markers, etc.).

b. Site preparation showing power service, construction of access roads, communication lines, foundation details, ground planes, grading, trenching, ducting, cable requirements and routing, and monitoring lines.

c. A PERT Time Network (Critical Path Method) for accomplishing all tasks.

The report shall be prepared so as to include, but not be limited to, the items shown in the following list:

Front Cover

Title Page

Table of Contents

Introduction

Discussion

Conclusion

Recommendations (if applicable)

Appendices

Back Cover

1-3.5.2.3.1 Obstacle clearance.- The report shall contain a certification that no objects penetrate the approach surface plane as defined in FAR, Part 77, or if there are penetrations, all objects penetrating the 50:1 slope on both ends of the runway will be identified and located.

1-3.5.2.4 Review of engineering report.- The engineering report shall be submitted in four copies to the Government Contracting Officer for review and approval. The contractor will not proceed with any site activity (construction and installation) until written approval is given by the Contracting Officer to the engineering report. The Government will approve or disapprove the report within 30 days (Saturdays, Sundays, and holidays excluded) from date of receipt by the Government. One copy of the report will be returned to the contractor, either with a statement that the report is acceptable and approved by the Government or with a statement of disapproval pointing out deficiencies and recommendations for correction. In the event of the latter, the contractor shall resubmit the revised report for approval. If requested by the contractor, an equitable modification to the contract will be made to the extent that the contractor is delayed solely because of failure of the Government to approve or disapprove within such 30 days.

1-3.5.2.5 Installation drawings and specifications.- This material shall be submitted with the engineering report and shall outline all siting geometry, construction details, instructions, specifications, and materials necessary to accomplish the installation. This will include as a minimum:

a. Location of localizer transmitter enclosure together with antennas, buried cable routing and monitoring devices.

b. Location of glide slope transmitter enclosure together with antennas, buried cable routing and monitoring devices.

c. Location and installation information for the marker transmitters, antennas and monitoring devices. These drawings will include that information required for access and protective fencing.

d. Location and installation information for the compass locator transmitter and antenna (where required). These drawings will include that information required for access and protective fencing.

e. Monitor circuit routing and tower installation.

f. Primary power installation including transformer mountings, wiring, substation details and buried cable routing.

g. Schematics and/or wiring diagrams of equipment interconnections not covered in other technical documents.

1-3.5.3 As-built drawings.- The contractor shall prepare and provide to the FAA TR 10 days prior to the scheduled Joint Acceptance Inspection date (4-3.8) a complete set of as-built drawings for each system or partial system installed. The as-built drawings shall include all construction and electrical/electronic work including buried cable charts with underground splices located and a detailed plot layout drawing for each facility. Electrical wiring diagrams shall include all interconnections and terminations of the systems. The as-built wiring diagrams shall include color coding identification in addition to the termination markings. Following the approval of the as-built drawings during the Joint Acceptance Inspection, the contractor shall provide to the Government a reproducible set and two complete copies of the corrected as-built drawings. All drawings shall be made on clear-print paper No. 1000H or equal with the FAA title block in the lower right-hand corner. Provide ½" borderlines on the top, bottom, and right-hand side. Provide a 1½" border on the left side. The drawings shall be made on "D" size sheets (22" x 34"). Sample title and index sheets will be furnished. Drawings shall be prepared in accordance with FAA-STD-002. These drawings will be reduced to one-half size by the FAA in the future. For this reason, the contractor shall take effort to assure that all drawings are clear and legible. The details and printing shall be of the size required for microfilming on 35mm film. The minimum letter height for a 22" x 34" sheet will be 5/32" and .05" spacing between letters. All letters shall be vertical capital letters.

1-4. QUALITY ASSURANCE PROVISIONS

1-4.1.- Not applicable.

1-5. PREPARATION FOR DELIVERY

1-5.1.- Not applicable.

1-6. NOTES

1-6.1.- None.

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